



UGP15N60

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT

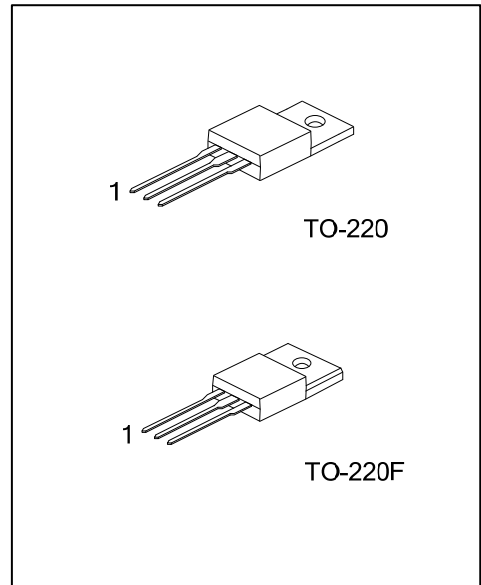
■ DESCRIPTION

The UTC **UGP15N60** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

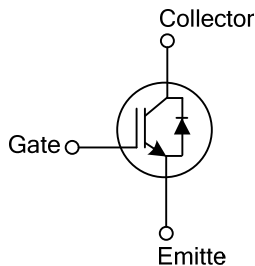
The UTC **UGP15N60** is suitable for high voltage switching, high frequency switch mode power supplies.

■ FEATURES

- * $V_{CE(SAT)} \leq 2.4V @ I_C=15A, V_{GE}=15V$
- * 600V Switching SOA Capability
- * High switching speed
- * High input impedance
- * Low conduction loss



■ SYMBOL



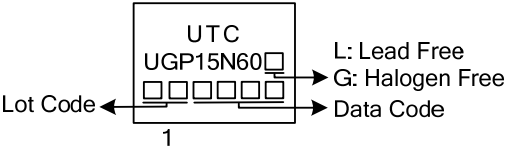
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGP15N60L-TA3-T	UGP15N60G-TA3-T	TO-220	G	C	E	Tube
UGP15N60L-TF3-T	UGP15N60G-TF3-T	TO-220F	G	C	E	Tube

Note: Pin Assignment: G: Gate C: Collector E: Emitter

<p>UGP15N60G-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V_{CES}	600	V
Gate to Emitter Voltage Continuous	V_{GES}	± 20	V
Continuous Collector Current	I_C	$T_C=25^\circ\text{C}$	30
		$T_C=100^\circ\text{C}$	15
Collector Current Pulsed (Note 2)	I_{CM}	45	A
Single Pulse Avalanche Energy (Note 3)	E_{AS}	66	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	7	V/ns
Power Dissipation	P_D	TO-220	125
		TO-220F	41.6
Junction Temperature	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L=5.0\text{mH}$, $PK_{IL}=5.15\text{A}$, $V_{CC}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_F \leq 8\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{CC} \leq BV_{CES}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	TO-220	1
		TO-220F	3

■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	BV_{CES}	$I_C=250\mu\text{A}$, $V_{GE}=0\text{V}$	600			V
Collector-Emitter Leakage Current	I_{CES}	$V_{CE}=600\text{V}$, $V_{GE}=0\text{V}$			200	μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=15\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.9	2.4	V
			$T_J=125^\circ\text{C}$	2.2		V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=250\mu\text{A}$, $V_{CE}=V_{GE}$	1.0		3.0	V
Gate to Emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}$, $V_{GE}=20\text{V}$			± 400	nA
Input Capacitance	C_{IES}	$V_{CE}=30\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		520		pF
Output Capacitance	C_{OES}			90		pF
Reverse Transfer Capacitance	C_{RES}			12		pF
Total Gate Charge	Q_G				70	
Gate-Emitter Charge	Q_{GE}	$I_C=15\text{A}$, $V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$		4.4		nC
Gate-Collector Charge	Q_{GC}			12		nC
Current Turn-On Delay Time	$t_{D(ON)}$	$I_C=15\text{A}$, $V_{CE}=400\text{V}$, $V_{GE}=10\text{V}$, $R_G=10\Omega$		8		ns
Current Rise Time	t_R			19		ns
Current Turn-Off Delay Time	$t_{D(OFF)}$			80		ns
Current Fall Time	t_F			2500		ns

SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS

Forward Voltage Drop	V_{FM}	$I_F=8\text{A}$			2.4	V
Reverse Recovery Time	t_{rr}	$I_F=8\text{A}$, $di/dt=200\text{A}/\mu\text{s}$		70		ns
Reverse Recovery Charge	Q_{rr}			90		μC

Note: Pulse Test: Pulse width $\leq 50\mu\text{s}$.

■ TEST CIRCUIT AND WAVEFORMS

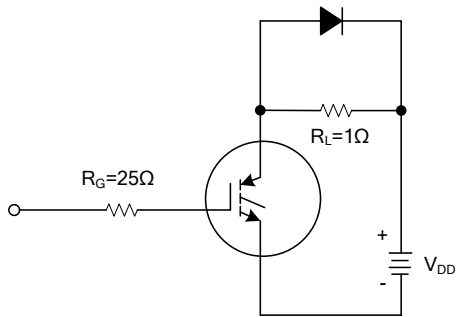


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

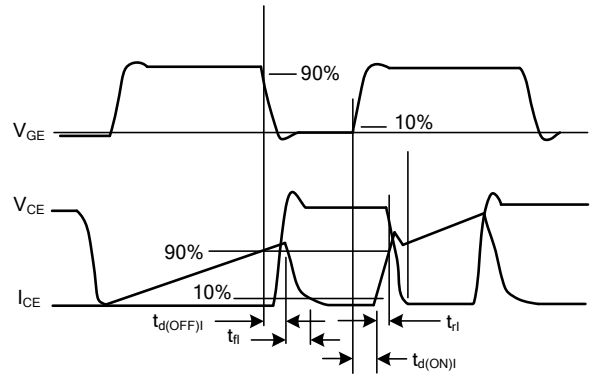
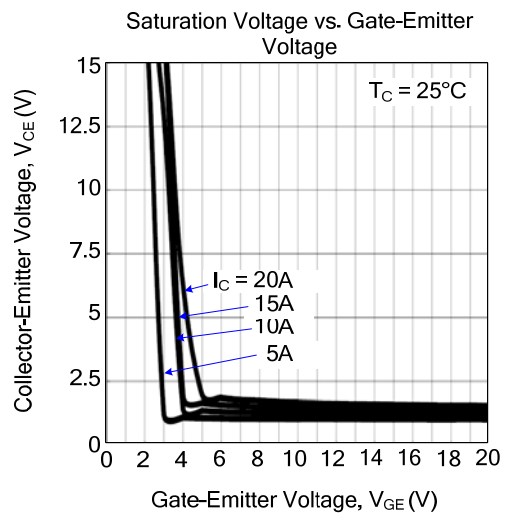
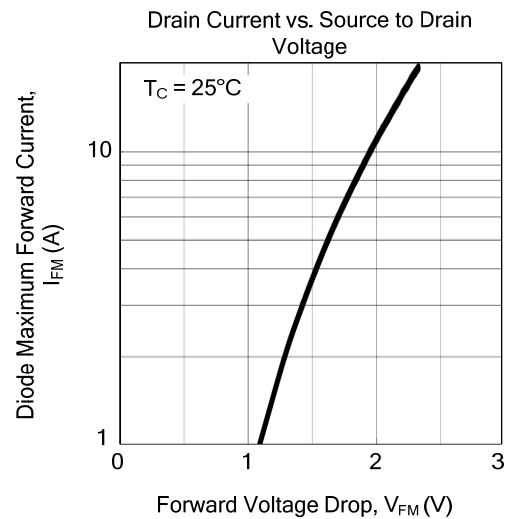
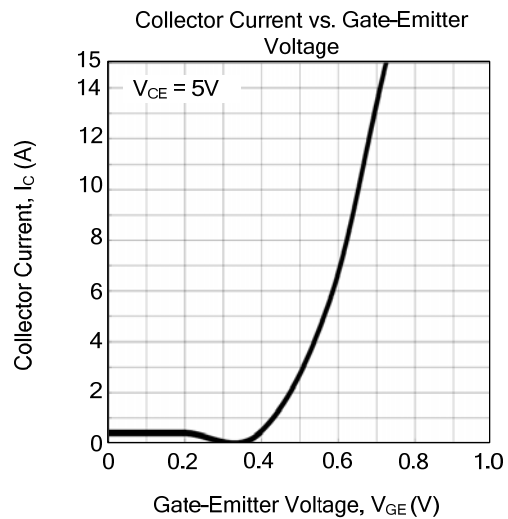
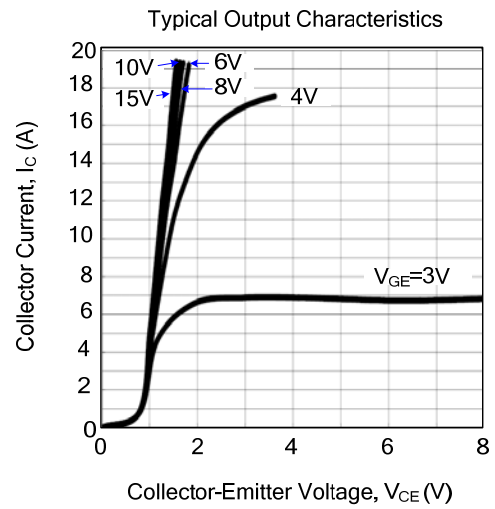
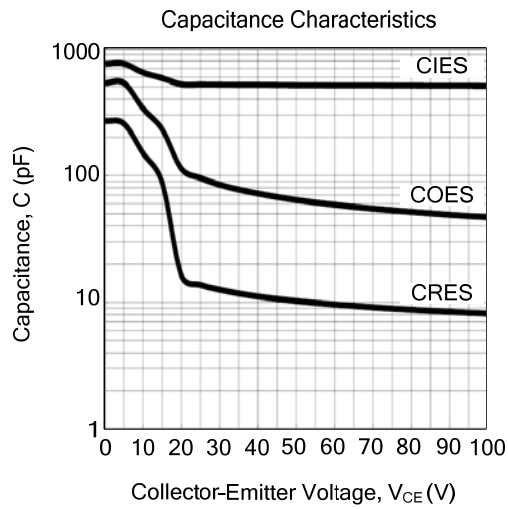


Fig 2. SWITCHING TEST WAVEFORMS

TYPICAL CHARACTERISTICS



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